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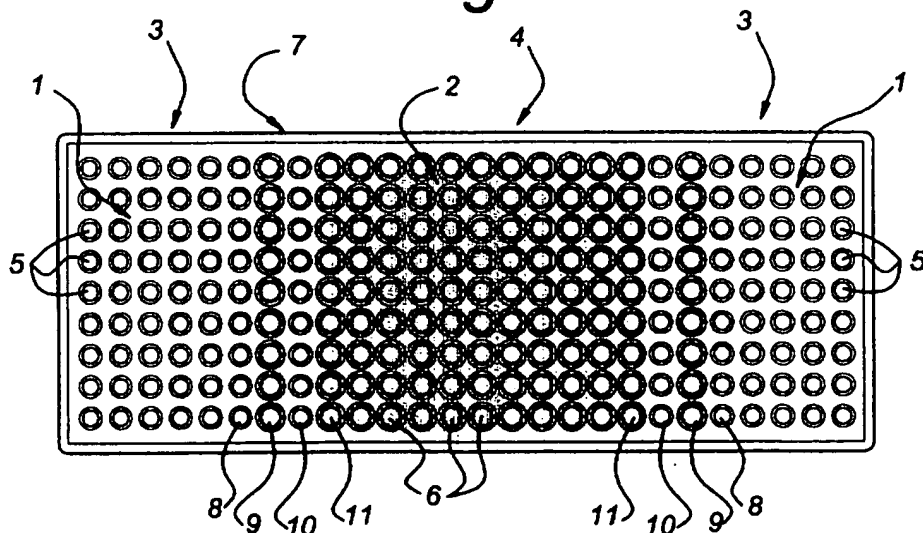
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(54) **Interior for a mattress**

(57) An interior for a mattress comprises rows of springs positioned transversely to the longitudinal direction of the interior and connected to one another in at least two series, which springs run parallel to one another transversely to the plane defined by the series, at least one series having springs which have a spring stiff-

ness that differs from the spring stiffness of the springs in another series. There are at least three successive rows at the location of the transition between the at least two series, the mid row of which has springs with a spring stiffness that differs from the spring stiffness of the springs in the adjacent rows.

**Fig 1**



## Description

[0001] The invention relates to an interior for a mattress, comprising rows of springs positioned transversely to the longitudinal direction of the interior and connected to one another in at least two series, which springs run parallel to one another transversely to the plane defined by the series, at least one series having rows of springs which have a spring stiffness that differs from the spring stiffness of the springs in the other series of rows.

[0002] Such interiors are generally known. By means of the rows of springs of different stiffnesses it is possible to obtain a zoning, the aim of which is to improve the comfort of the mattress. Usually, at least three zones are used, the mid zone of which has springs of a greater stiffness. Said mid zone is in the region of the relatively heavy part of the body. By virtue of these stiffer springs, the compression of the mid zone of the mattress is not too excessive in comparison with the compression at the location of the end zones of the mattress, as a result of which comfort can be improved. The hips are supported somewhat more firmly than are, for example, the shoulders, which can sink in deeper.

[0003] Although such a zoning yields an improvement in comfort, account must be taken of the fairly abrupt transitions between the various zones. The differences in stiffness which arise at the locations of these transitions are detrimental to comfort and can lead to back pain. For these reasons a pressure distributor in the form of a layer of wadding, horsehair, felt, jute, coconut fibre and the like is therefore also used, the purpose of which is to balance out these differences in stiffness.

[0004] However, these pressure distributors are frequently not adequate. Moreover, they have the effect of increasing the cost and they restrict the adjustability of the mattress. This disadvantage arises in particular when the mattress is used in combination with an adjustable mattress support.

[0005] As an alternative it has been proposed to make the transitions more fluid by using springs which have a stiffness between that of the springs of the two adjacent zones. However, this leads to complications in production and also to higher costs. For these reasons this alternative is preferably not employed.

[0006] The aim of the invention is therefore to provide an interior for a mattress with which a gradual transition between the zones of different stiffness can be obtained without supplementary components or increases in costs. Said aim is achieved in that there are at least three successive rows at the location of the transition between the at least two series, the mid row of which has springs with a spring stiffness that differs from the spring stiffness of the springs in the adjacent rows.

[0007] In the case of the interior according to the invention, a gradual transition between the zones is obtained in that one row of spring elements of a specific stiffness is accommodated between two rows of spring

elements of a different stiffness. This combination of three successive rows of spring elements of unequal stiffnesses yields in its totality a transition region which has an approximately averaged stiffness. However, this average stiffness is obtained without making use of a third type of springs of a spring stiffness between those of the springs in the two zones.

[0008] It is also an advantage that the construction of the interior barely changes and that the desired succession of the rows of springs can easily be programmed on an automated machine. The interior according to the invention has a transition region which provides a gradual transition between two zones of unequal stiffness, without additional costs being incurred as a result. A saving in costs can even be made because the pressure distributor can be thinner or can even be omitted completely.

[0009] According to a first possible variant, there can be at least four successive rows at the location of the transition between the at least two series, each of these rows having springs of a spring stiffness that differs from the spring stiffness of the springs in an adjacent row. The transition region then in fact consists of the four successive rows of spring elements, alternating rows having a different stiffness.

[0010] If desired, a larger transition region can be formed if there are six successive rows at the location of the transition between the at least two series and each of these rows has springs of a spring stiffness that differs from the spring stiffness of the springs in an adjacent row.

[0011] As already mentioned, the interior can comprise three zones, each consisting of a series of rows of a specific spring stiffness. The two transitions occurring in this arrangement can each be constructed with a transition region as described above. Of course, it is also possible to use more than three zones, with the desired transitions between them.

[0012] The rows of springs can be made up in various known ways. This can, for example, be carried out with the aid of clips for joining the springs to one another or with the aid of spiral springs. Preferably, however, each row comprises a strip of flexible material that is divided into pockets, one spring being accommodated in each pocket.

[0013] The invention also relates to a mattress made of a flexible material, such as foam material, and a cover. Since the transitions between the zones have a gradually changing stiffness it is no longer necessary to fit a pressure distributor, so that the cover adjoins the interior by means of a layer which improves comfort, such as a foam layer. Such a foam layer is relatively soft and is not primarily intended as a pressure distributor.

[0014] According to a preferred embodiment, only two types of springs are used in the interior according to the invention and the stiffness of the one type of springs differs from the stiffness of the other type of springs.

[0015] The advantage of this embodiment is that, on

the one hand, the costs of such an interior can remain restricted and that, on the other hand, the desired zoning with a gradual transition between the different stiffness zones can nevertheless be obtained.

[0016] The invention will be explained in more detail below with reference to an illustrative embodiment shown in the figures.

[0017] Fig. 1 shows a plan view of an interior according to the invention.

[0018] Fig. 2 shows a section through a row of spring elements in Fig. 1.

[0019] The interior for a mattress shown in Fig. 1 is made up of three series 3, 4, which each consist of rows 1, 2 of springs 5, 6 connected to one another. As shown in Fig. 2, the springs 5, 6 are each accommodated in a pocket 14 which is formed by a continuous flexible cover 13. This flexible cover 13 is divided into the separate pockets 14 by means of joins 15.

[0020] As shown diagrammatically in Fig. 2, the springs 5, 6 of the mid series 4 have a greater spring stiffness than the springs 5, 6 of the outer series 3. As a result the relatively heavy part of the human body at the location of the hips does not give rise to excessive compression in the interior. The shoulders, on the other hand, are supported by relatively flexible springs, so that the compression can be greater at this location, which is beneficial for comfort.

[0021] In the existing mattresses, however, the transition between the series 3, 4 can clearly be felt, which is detrimental to comfort. According to the invention this disadvantage is eliminated by making the transition between the series 3, 4 more gradual. To this end a row 10 of relatively flexible springs is incorporated between two rows 9, 11 of relatively stiff springs. In turn, row 9 of relatively stiff springs is also incorporated between two rows 8, 10 of relatively flexible springs.

[0022] In this way a transition region is created consisting of the four rows 8, 9, 10, 11 with alternating stiffnesses between each row, with the result that the differences in stiffness between the series 3, 4 have a fluid transition into one another.

[0023] A further advantage of the invention is that this fluid transition is obtained without additional structural elements or without springs of a different stiffness. The advantage is, furthermore, that the production of the interior can still take place normally on the assembly machines already available for this purpose. These machines can now be so programmed that the relevant rows 9, 10 are changed compared with the earlier construction of the interior.

[0024] Although the interior according to Fig. 1 is made up of springs 5, 6 which are accommodated in the flexible cover 13, the invention is not restricted to this. The springs can also be attached to one another by means of clips or the like. Any interior in which rows of springs are combined to form series falls within the scope of the invention.

## Claims

1. An interior for a mattress, comprising rows (1, 2) of springs (5, 6) positioned transversely to the longitudinal direction of the interior and connected to one another in at least two series (3, 4), which springs (5, 6) run parallel to one another transversely to the plane defined by the series (3, 4), at least one series (3) having springs (5) which have a spring stiffness that differs from the spring stiffness of the springs (6) in another series (4), characterised in that there are at least three successive rows (8 - 10) at the location of the transition (7) between the at least two series (3, 4), the mid row (9) of which has springs (6) with a spring stiffness that differs from the spring stiffness of the springs (5) in the adjacent rows (8 - 10).
2. Interior according to Claim 1, wherein there are at least four successive rows (8 - 11) at the location of the transition (7) between the at least two series (3, 4) and each of these rows (8 - 11) has springs (5, 6) of a spring stiffness that differs from the spring stiffness of the springs (5, 6) in an adjacent row (8 - 11).
3. Interior according to Claim 1 or 2, wherein there are six successive rows at the location of the transition between the at least two series and each of these rows has springs of a spring stiffness that differs from the spring stiffness of the springs in an adjacent row.
4. Interior according to one of the preceding claims, wherein each series (3, 4) of rows (1, 2) of springs (5, 6) of equal spring stiffness comprises at least three rows (1, 2) connected to one another.
5. Interior according to one of the preceding claims, wherein three series (3, 4) of rows (1, 2) are provided and the mid series (4) has springs (6) of a spring stiffness greater than the spring stiffness of the springs (5) of the outer series (3).
6. Interior according to Claim 5, wherein the spring stiffness of the springs (5) of the one outer series (3) is identical to the spring stiffness of the springs (5) of the other outer series (3).
7. Interior according to one of the preceding claims, wherein the springs (5, 6) are barrel-shaped.
8. Interior according to one of the preceding claims, wherein each row (1, 2) comprises a strip of flexible material (13) that is divided into pockets (14) and each pocket contains one spring (5, 6).
9. Mattress, provided with an interior according to one

of the preceding claims, edge coverings made of a flexible material, such as foam material, and a cover.

10. Mattress according to one of the preceding claims, 5  
wherein the cover adjoins the interior by means of  
a layer which improves comfort, such as a foam layer.
11. Mattress according to one of the preceding claims, 10  
wherein the springs (5, 6) in each row (1, 2) have  
an identical stiffness.
12. Mattress according to one of the preceding claims, 15  
wherein at most two types of springs are used and  
the stiffness of the one type of springs differs from  
the stiffness of the other type of springs.

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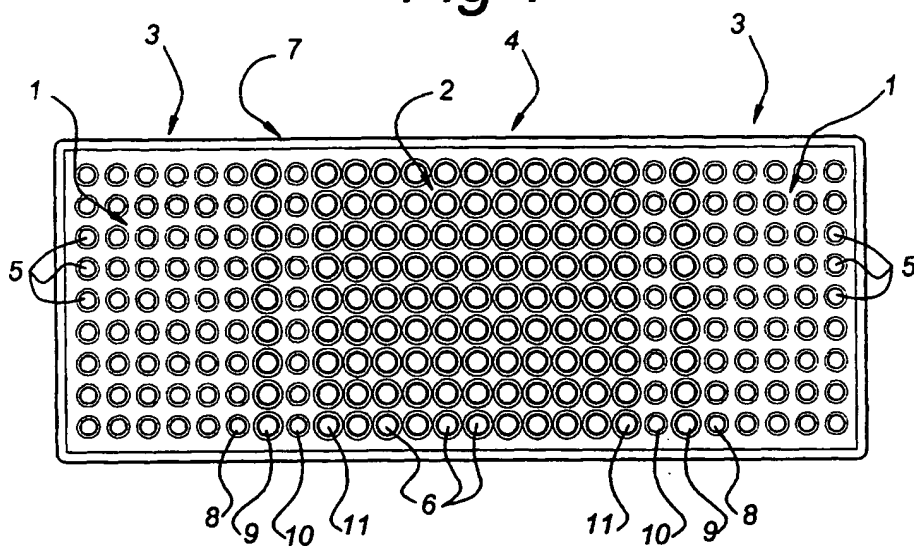
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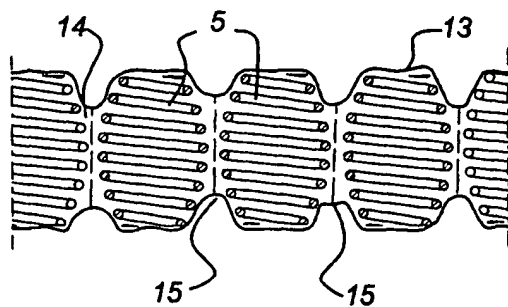
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**Fig 1**



**Fig 2**





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# EUROPEAN SEARCH REPORT

Application Number  
EP 01 20 0697

| DOCUMENTS CONSIDERED TO BE RELEVANT   |   |                                  |  |
|---|---|----------------------------------|--|
| Category  | Citation of document with indication, where appropriate, of relevant passages   | Relevant to claim                | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
| Y   | AU 602 302 A (GADSDEN PTY LTD J)<br>13 August 1990 (1990-08-13)<br>* page 6, line 28,29 - page 7, line 1,2;<br>figure 2 * | 1-6                              | A47C27/06                                    |
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| Place of search   |   | Date of completion of the search | Examiner                                     |
| THE HAGUE   |   | 25 April 2001                    | van Bilderbeek, H.                           |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/> Y : particularly relevant if combined with another document of the same category<br/> A : technological background<br/> O : non-written disclosure<br/> P : intermediate document</p> <p>T : theory or principle underlying the invention<br/> E : earlier patent document, but published on, or after the filing date<br/> D : document cited in the application<br/> L : document cited for other reasons<br/> &amp; : member of the same patent family, corresponding document</p> |   |                                  |  |

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82